- Formulation for Brinkman flow with vorticity, and permeability $k(x)$

$$\text{Brinkman} \begin{cases} \partial_t u + K^{-1} u + \sqrt{\nu}\, \text{curl}\,\boxed{w} + \nabla p = f(c) \\ \text{div } u = 0 \\ w = \sqrt{\nu}\,\text{curl } u \end{cases}$$

$K(c)$ — weak coupling

$$\begin{cases} \partial_t c + u \cdot \nabla c - \text{div}\left(D \nabla c \right) = g(c) \\ K(c,x) \end{cases}$$

$K(c,x)$ → low / high

- Blobs with low permeability.

  (code + paper)

RandomCircle (center, radius, density)

$(2,1)$

$(0,0)$
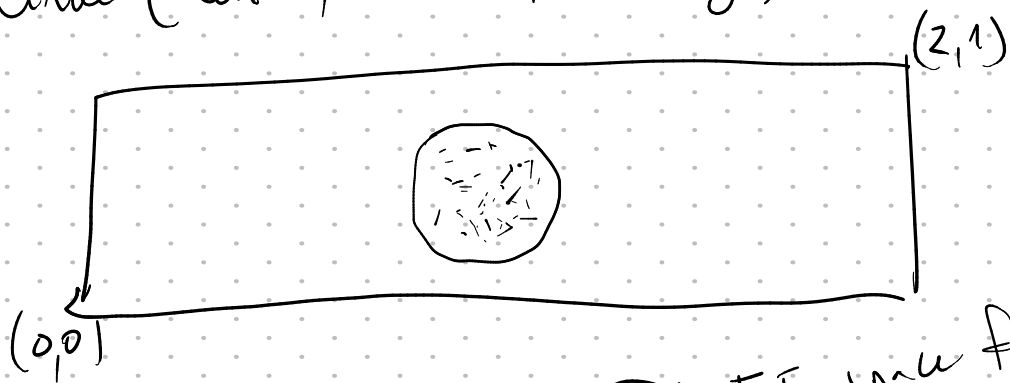
lagrangian particles (V_u) → FE space for velocity !!

Brownian-transport does not depend on ℓ_p

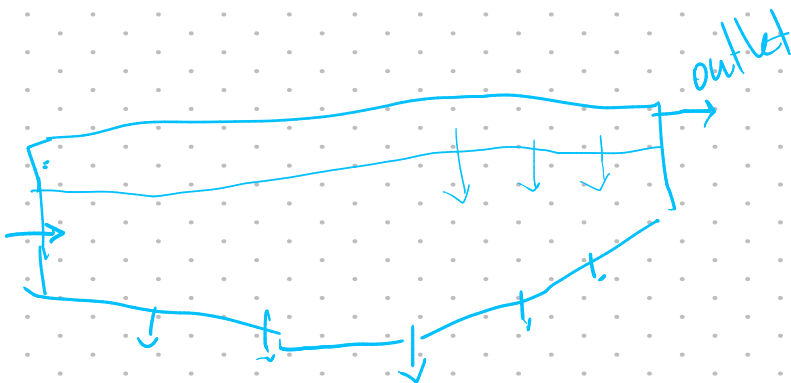ℓ_p step (velocity, time step)

x_i

$\dot{x} = u$

$\dfrac{x^{n+1} - x^n}{\Delta t}$

$x_i^{n+1} = \Delta t \, u + x_i^n$

position

FE function

- Open xdmf file (with $u, P, --$)
- Open all particle files with the Treader
- Select Point Gaussian representation.

3D vortex flows + transport

outlet

Check if MiroK has 3D

Sedimentation on clarification limit